TABLE OF CONTENTS

Step 1. Applicant Information and Project Summary Form…… 2
Step 2. Proposal Abstract…….. 4
Step 3. Technical Narrative…….. 5
A. Project Need…….... 5
B. Project Goals and Objectives……... 7
C. Project Implementation Plan…… 9
D. Project Time Schedule……... 12
E. Methods and Technical Feasibility…… 13
F. Monitoring Plan…….. 14
G. Qualifications of Project Team…….. 15
H. Supporting Technical Documents…….. 15
Step 4. Criteria Statements……..16
Step 5. Proposal Budget……19
Appendix I: Project Location Maps…… i
Appendix II: Letters of Support……... v

Step 1. APPLICANT INFORMATION AND PROJECT SUMMARY FORM

1. **Name of Applicant:** Avian Science Center at the University of Montana

2. **Project Title:** Birds' Eye View Education Program

3. **Type of Entity:** University of Montana

4. **Description of Project Location:** Upper Clark Fork Watershed

5. **Injured Natural Resources to be Restored through Project:**
Public interest and knowledge of bird communities along the Upper Clark Fork River.

6. **Authorized Representative:**
Pat Bristol, Sponsored Programs Manager
Office of Research and Sponsored Programs
University of Montana
Missoula, MT 59812
406-243- 4771
Pat.Bristol@umontana.edu

Contact Person (s):

Richard Hutto, Professor & Director
Avian Science Center
Division of Biological Sciences
University of Montana
Missoula, MT 59812
406-243-4292
hutto@mso.umt.edu

Kristina Smucker, Program Coordinator
Avian Science Center
Division of Biological Sciences
University of Montana
Missoula, MT 59812
406-243-2035
kristina.smucker@mso.umt.edu

7. **Proposed Funding Sources**

Funding Source	Amount in ($) Dollars					Matching Fund Percentage (Funding Source Total/Project Total)
	Commited Funds			Uncommitted Funds	Total	
	Grants	Non-Grant Funds				
		Cash	In-kind			
A. UCFRB Restoration Fund	$ 24,994.80				$ 24,994.80	80.46%
B. Plum Creek Timber Co.			$ 2,000.00		$ 2,000.00	6.44%
C. Avian Science Center at			$ 4,069.00		$ 4,069.00	13.10%
D.						
E.						
F.						
G.						
H.						
I.						
Non-NRDP Totals	$ 24,994.80		$ 6,069.00		$ 6,069.00	**19.54%**

8. **Estimated Total Project Cost:** $31,063.80

9. **Private Grant Applicant Financial Information:** This is not a private applicant.

10. **Certification for Individuals or Private Entities:** This is not a private applicant.

11. Authorizing Statement

An authorized agent/agents representing the applicant must by his/her signature indicate that the application for funds and expenditure of matching funds, as represented, is officially authorized.

Grant Authorization

I hereby declare that the information included in and all attachments to this application are true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local, and federal laws and regulations.

I further declare that, for _____(Project Sponsor), I am legally authorized to enter into a binding contract with the State of Montana to obtain funding if this application is approved. I understand that the Governor must authorize funding for this project.

_____ _____
Project Sponsor Date

_____
Authorized Representative (signature) Title

Step 2. PROPOSAL ABSTRACT

Healthy riparian areas play a vital role in maintaining ecological processes and provide critical habitat and food resources for many of Montana's wildlife species. The high diversity of bird species that can be found in healthy riparian habitats exemplifies the importance of these areas in maintaining viable wildlife populations. Almost 90% of Montana's 300+ breeding bird species are known to nest in riparian vegetation and nearly half are restricted in their distribution to riparian habitats (Mosconi and Hutto 1982). In the Upper Clark Fork River Basin (UCFRB), riparian habitats have been injured by hazardous substances produced during decades of mining and mineral processing in and around Butte and Anaconda. Current restoration projects focusing on repairing injured riparian areas will benefit both humans and wildlife living within the watershed.

To educate citizens within the UCFRB on the ecological effects of past mining activities and current restoration projects, the Avian Science Center at the University of Montana seeks $24,995 to develop and implement its Birds' Eye View program. This program will use birds as a tool to educate families living within the UCFRB on (1) how their watershed has been injured by mining activities, (2) how birds have been injured affected by mining activities, (3) the kinds of activities and projects that have been implemented to remediate and restore areas injured by mining activities, and (4) how birds can be used to measure the success of restoration efforts. The Birds' Eye View program will be implemented at bird banding stations and on bird watching fieldtrips at riparian sites within the basin. The program will offer unique opportunities for the public to observe birds that breed in riparian areas and learn about, from a bird's perspective, the ecological effects of mining and current restoration efforts. Capturing and banding birds allows the public to meet many of Montana's songbirds up close, while providing a wealth of scientific data on the "vital rates" of birds (i.e. survival and reproduction). All data collected at banding stations will become part of a larger database for the Monitoring Avian Productivity and Survivorship (MAPS) program, which has over 500 partner banding stations spread across North America.

A pilot version of the Birds' Eye View program will be implemented in Summer 2006 with one bird banding station and two bird watching fieldtrips. In Spring 2007 the Birds' Eye View education materials will be expanded through consultation with the PIs of Natural Resource Damage Program (NRDP) restoration projects, and the program will grow to include three bird banding stations and four field trips. The final version of program materials will be packaged into a lesson for incorporation into the Clark Fork Watershed Education Project's (CFWEP) watershed science curriculum. This proposal will also help CFWEP meet Track II goals by offering internships to four UCFRB high school students and Track III goals by offering stipends for 15 teachers to participate in the Birds' Eye View program.

The $24,995 requested from NRDP will be used to develop the Birds' Eye View education program, staff and operate the bird banding stations, offer stipends for teachers, and make educational materials available on the web. Total project cost is estimated at $31,064 with $2000 provided in bird banding supplies from Plum Creek Timber Company and the remaining $4,069 to be provided as in-kind support from the Avian Science Center.

Step 3. TECHNICAL NARRATIVE

A. Project Need

1. Problem Description:

Riparian areas support the highest diversity of bird species of any habitat in Montana, and nearly half of Montana's 300+ breeding bird species are restricted in their distribution to riparian vegetation (Mosconi and Hutto 1982). Unfortunately, hazardous substances produced during decades of mining and mineral processing in around Butte and Anaconda have injured many of the riparian habitats in the Upper Clark Fork River Basin (UCFRB) that are important for birds and a variety of other wildlife species. Hundreds of acres within the basin have been remediated and restored over the last decade, and once complete restoration efforts between Butte and the Milltown reservoir will amount to over $1 billion. While the long-term success of this investment depends on the environmental stewardship provided by those living within the watershed, the public currently demonstrates little interest in or knowledge of restoration efforts along the upper Clark Fork River.

The Birds' Eye View Education Program will address three different types of needs within the Upper Clark Fork Watershed.

(1) Public education on the ecological effects of mining activities: First, this program will offer families living within the basin a "Birds' Eye View" of how past mining activities have negatively affected the habitat, birds, and other wildlife within the basin, the kinds of restoration projects that are currently underway, and the response of birds to these restoration efforts. Data compiled by the Clark Fork Watershed Education Project (CFWEP) reveal that residents within the basin exhibit low community scientific literacy and that fewer than 30% of adults hold bachelor's degrees. Further, a questionnaire given to first through fifth graders at Ramsay School demonstrated major gaps in their knowledge of local history (e.g. What industry played an important role in Butte's history?) and the environment in which they live (e.g. What kind of contamination is found in the Berkeley Pit water?) (Ramsay School Watershed and Ecosystems, unpublished data).

(2) Involvement in the process of science: Besides possessing only a rudimentary understanding of the ecological effects of mining activities, opportunities for the general public to observe biologists collecting data and take part in the process of science are rare. Bird banding stations offer a unique opportunity for the public to interact with biologists, observe birds at very close range (i.e. "in-the-hand"), and learn about birds that breed in riparian areas. The Birds' Eye View program will engage families living within the basin in a way that few education programs can: by inviting them into the field to make their own observations on the ecological effects of mining, consult biologists, and formulate their own conclusions. This hands-on approach will not only increase the ecological literacy of citizens within the basin, it will provide a sense of ownership of this knowledge.

(3) Baseline scientific data: While the primary purpose of this program is to provide educational opportunities, a secondary objective is to provide scientific data on the species composition, productivity, and survivorship of songbird communities that live within the watershed. There is currently a need for baseline data on riparian bird communities along a disturbance gradient,

from those that are relatively unaffected to those heavily damaged by past mining activities. In 2005, the Avian Science Center initiated surveys to address the need for information on bird communities along the Upper Clark Fork River by conducting bird counts at over two dozen sites. Thus, bird banding data would augment a growing database that could be used to evaluate the health of riparian areas within the UCFRB.

2. Circumstances precipitating project need:

Opportunities for collaboration: There is a need to provide opportunities for families living within the UCFRB to learn about the environment in which they live. The Natural Resource Damage Program has already provided funding for two education programs (Clark Fork Watershed Education Program and Ramsay School Watershed and Ecosystems) that use schools from Butte to Bonner to reach children living within the basin. This proposal would complement these programs by targeting *both children and adults* within the basin with activities that take place during the *summer* (June – August). The Birds' Eye View program will also be incorporated into these school-year education programs by creating bird specific curricula for inclusion within CFWEP's watershed science curriculum guide.

The Clark Fork Watershed Education Program has documented the need for (1) scientific mentors for students and (2) opportunities that take advantage of the Clark Fork River as a natural laboratory. Our proposal to operate bird banding stations within the upper Clark Fork basin would address both these needs: students and their parents would be invited to observe and interact with biologists collecting scientific data on birds. In addition, this proposal would help CFWEP meet or exceed their Track II and Track III goals of working with high school students and teachers by offering stipends to 15 UCFRB teachers and internships to four UCFRB high school students.

Scientific data are lacking: Because so many bird species depend on riparian areas, birds offer a particularly valuable perspective on the ecological effects of past mining activities. While, few data exist to quantify the effects of mining activities and toxic substances on avian communities, several studies conducted in other areas have documented negative direct effects, in the form of zinc and lead poisoning (Beyer et al. 2005) and mining waste induced genetic damage in wild birds (Pastor et al. 2004). Mining activities are also likely to have indirect effects on bird communities when riparian vegetation and insect communities are negatively affected. Specifically, many birds depend on riparian areas for two kinds of resources: they build their nests in shrubs, and they feed themselves and their nestlings on the abundant insect biomass available therein. Thus, mining activities and hazardous substances may have decreased both the quantity and quality of nesting sites and food resources.

There are currently few data on the composition of bird communities affected by mining activities within the basin, but in 2005 the NRDP initiated bird surveys within Sub-area 1 of Silver Bow Creek to investigate temporal changes in bird use following remediation and re-vegetation work (Prodgers 2006). Bird communities within this heavily impacted area contain few songbird species that depend on riparian vegetation (e.g. yellow warbler, warbling vireo) and instead are composed primarily of aerial insectivores (e.g. swallows, especially cliff swallow), grassland species (e.g. western meadowlark, savannah sparrow), and wetland dependent species

that nest primarily in tall grass and cattails rather than shrubs (e.g. song sparrow, red-winged blackbird) (Prodgers 2006). Bird community composition data from other areas within the basin would be valuable for assessing how species composition varies across the gradient of mining damage.

Capturing and banding birds provides data on productivity and survivorship that cannot be obtained from observational surveys (e.g. point counts) or other kinds of inventory data. The operation of bird banding stations will allow us to not only develop species lists and provide estimates of the number of breeding birds, but we can also learn about the timing of breeding efforts and obtain estimates of annual adult survival as well as number of young birds using riparian areas. These rates can then be compared across an environmental gradient- from undamaged riparian areas to those heavily affected by past mining activities or other human induced disturbances (e.g. grazing by livestock, recreational activities).

Finally, because the majority of lands within the Upper Clark Fork River Basin have been affected by the mining, milling, and smelting activities carried out by the Anaconda Copper Mining Company, there is a need for widespread remediation and restoration activities to repair these damaged habitats. Once these efforts are completed, the riparian areas within the UCFRB have the potential to provide productive, high quality habitat for birds and other wildlife species. Birds can be a valuable tool for both evaluating the success of restoration efforts and for educating citizens living within the UCFRB on why restoration is needed and how birds are responding to these efforts.

3. Ongoing or past efforts that address the needs of the project:
The Avian Science Center has been involved in the operation of a bird banding station at Seeley Lake for the past 5 years, and that operation has been a tremendous success—in just 7 banding dates each summer we've reached over 500 visitors of all ages. Visitors to the station have the opportunity to (1) observe and even participate in bird research, (2) learn about the natural history of birds breeding in Montana, and (3) gain an understanding of why riparian habitat is so vital to maintaining healthy bird populations. More information, including a five-year report, is available at our web site: http://avianscience.dbs.umt.edu/research_wrenbanding.htm.
The current proposal would expand and re-focus this existing and very successful education program to address the specific issues that birds on the Clark Fork River face as a result of past mining activities.

B. Project Goals and Objectives.
1. Project goals:
The Birds' Eye View education program will be implemented via bird banding stations and birding field trips along the Clark Fork River. This program is unique because it targets families that live within the Upper Clark Fork River Basin and takes place primarily outside the school year. The goals of the program are to provide opportunities for families living within the UCFRB to observe and learn about:

- how their watershed has been injured by decades of mining activities,
- how birds have been injured indirectly by these activities,

- the kinds of restoration and remediation activities and projects that have been implemented in the areas injured by mining activities, and
- how birds can be used as tools to measure the success of these restoration efforts.

2. Objectives to accomplish goals:
To accomplish these program goals we will implement a pilot of the Birds' Eye View education program in summer 2006 at one bird banding station, and expand the program in 2007 to include three bird banding stations. Fieldtrips will be used in both years to collect bird count data and compare bird communities between relatively damaged and undamaged sites. Specifically, our objectives are to:

1. Operate 1 bird banding station in 2006 and conduct 2 birding field trips.
2. Operate 3 bird banding stations in 2007 and offer 4 birding field trips.
3. Support the NRDP funded Clark Fork Education Program by expanding our role as a technical advisory board member to help CFWEP meet Track II and Track III goals. To meet this goal we will:
    a. Provide stipends for five UCFRB teachers in 2006 and ten teachers in 2007 to visit a banding station and participate in the Birds' Eye View program.
    b. Provide internships for four UCFRB high school students to do an internship with the Avian Science Center and assist with the banding stations (Summer 2007).

3. Quantitative results:
The Birds' Eye View education program will provide a window through which families within the UCFRB can see for themselves how birds have been affected by past mining activities and current restoration efforts. Based on visitation rates at our Seeley Lake bird banding station we expect an average of 15 participants per banding date. So with eight banding dates and two field trips in 2006 we expect to reach 150 individuals, and with 24 banding dates and four field trips in 2007 we expect over 400 participants. The Birds' Eye View program will be made available to an even larger number of students within the basin via two avenues:

1. The 15 teachers that receive stipends to visit banding stations and gain the experience and materials to implement the program in their classrooms, and
2. by including this program within CFWEP's watershed science curriculum guide.

Four high school students within the basin will complete internships with the Avian Science Center in the summer of 2007. While the results of educational experiences are difficult to quantify students will gain skills, knowledge, and confidence in their ability to conduct scientific research that will prepare them for pursuing advanced degrees in math and science. The Clark Fork Watershed Ecology Program has documented a need for programs and experiences that prepare and encourage students within the basin to pursue college degrees.

All bird banding data collected through this program will be included within the Monitoring Avian Productivity and Survivorship (MAPS) program administered by the Institute for Bird Populations (http://www.birdpop.org/), in California. There are over 500 partner MAPS stations distributed throughout North America, and this network of stations allows for region-wide analyses of bird population trends that would not be possible with data from a single station.

C. Project Implementation Plan

1. Overall approach

We will use bird banding stations and birding field trips to implement the Birds' Eye View Education Program (BEVEP). This 3-hour program will be offered twice each morning at bird banding stations and on birding field trips. Bird banding stations will be operated once every 10 days, in accordance with the MAPS protocol to maximize capture rates.

In 2006 we will operate a bird banding station at Beavertail Hill State Park, which abuts 1-90 and is located 25 miles east of Missoula, MT. This station will serve as a reference site, as the riparian vegetation shows little or no evidence of damage due to mining activities. We will continue operation of this banding station in 2007 and commence the operation of two additional banding stations, one at Grant-Kohrs National Park located just north of Deer Lodge, MT, and a second station at the Clark Fork Coalition's Dry Cottonwood Ranch near Galen, MT. Both sites contain riparian vegetation in good condition as well as areas that show damage as a result of past mining activities. All three sites have existing educational and interpretive programs aimed at teaching the general public about natural resources, and thus the current proposal to focus on birds and the ecological effects of mining fits well with their overall goals.

In both 2006 and 2007, bird watching fieldtrips will be offered at these same sites as well as at other sites showing more extensive damage from past mining activities, such as Silver Bow Creek between Nissler and Opportunity. We are particularly interested in working with the Natural Resource Damage Program to select sites for bird watching fieldtrips where restoration projects can be featured.

We will advertise the Birds' Eye View education program and dates for bird banding stations and birding fieldtrips using a wide variety of media and methods, including: (1) the Avian Science Center web site, (2) area newspapers and radio stations, (3) partner groups (e.g. Grant-Kohrs National Park and MT FWP), and (4) teachers and students we have access to via our relationship with CFWEP.

2. Project phases:

Phase I: June – August 2006 Pilot Season

Phase I will consist of initiating the development of education materials for the Birds' Eye View education program and implementing a scaled back pilot field education effort. Tasks include:

a. Incorporate information on mining activities and damages to wildlife and habitat along the UCFRB into the existing education materials from our Wings in the Wetlands Program, offered for the past 5 summers at the Seeley Lake banding station.
b. Interview the PIs on two NRDP funded restoration projects within the UCFRB project area to incorporate information on current restoration activities.
c. Recruit five UCFRB teachers to participate in BEVEP in summer 2006.
d. Operate one banding station eight times between June 1 and August 15.
e. Offer two birding field trips to sites within the basin to observe bird communities in damaged and undamaged sites.

Phase II: January – April 2007
During phase II we will further develop education materials for BEVEP by adding information from more extensive interviews with additional NRDP-funded restoration projects. In addition we will work closely with CFWEP to package our final BEVEP materials into a lesson for their larger watershed science curriculum package which will be available to all teachers within the UCFRB by the end of their project year three. Finally we will expand our role on the technical advisory board of CFWEP by offering internships to four UCFRB high school students who will help operate bird banding stations in summer 2007. Tasks include:

a. Interview four additional PIs on two NRDP funded restoration projects within the UCFRB project area to incorporate information on current restoration activities.
b. Finalize all educational materials for BEVEP and package these materials for distribution via our web site and as a lesson within CFWEP's science curriculum.
c. Recruit 10 UCFRB teachers to participate in BEVEP in summer 2007.
d. Recruit four UCFRB high school students to do internships with the Avian Science Center in summer 2007. The internship will consist of helping with the operation of bird banding stations and implementing BEVEP.

Phase III: June – August 2007
Phase III will consist of implementing the Birds' Eye View education program via three bird banding stations situated within the UCFRB and offering four birding field trips between June and August. One technician for every 10-15 participants will facilitate the 3-hour program. The program is designed to reach participants of all ages and knowledge levels. The program has four educational goals that will be addressed through a combination of quizzing participants on their existing knowledge at the beginning of the program and providing hands-on education on these topics in the field.

The Birds' Eye View Education Program (BEVEP) program will consist of the following components, and here we provide examples of the kinds of pre-test questions and education topics that will be covered:

1. *Arrival, introductions, and overview* (10 min)
2. *Mining injuries to the UCFRB* (20 min)
    a. Pre-test questions (sample questions):
        i. What do you know about past mining activities on the Clark Fork River?
        ii. What kinds of toxic substances were produced and released via mining activities?
        iii. How has this affected the river ecosystem?
    b. Education topics
        i. Brief overview of injuries caused by mining activities.
        ii. Discussion of toxins and their effects on vegetation and wildlife.
        iii. View a site where mining toxins have negatively affected plant growth (either in the field or with photos).
3. *Bird response to injuries caused by mining* (1 hour)
    a. Pre-test questions (sample questions):
        i. What birds live in riparian areas and thus might be affected by mining activities?
        ii. Why do birds live in riparian areas and what kind of resources are they using?
        iii. How might birds be affected?

   b. Education topics:
      i. Explain how we can use bird counts and banding stations to learn about birds and study the effects of mining (or any other factor of interest)
      ii. Discuss why biologists band birds, the kinds of data we collect, the larger MAPS program goals.
      iii. Do a bird count or visit the banding station (in an injured area) and see who lives there. Follow up with the data we've collected using bird counts and/or bird banding in injured areas.
      iv. Find a bird nest! Observe birds in breeding condition at the banding station, discuss songbird nesting biology, learn that nestlings are raised on insects which may contain toxins, etc.
4. *Activities and projects that have been implemented to remediate and restore the areas injured by mining activities* (30 min)
   a. Pre-test question topics: find out what participants know about restoration activities and NRDP funded projects.
   b. Education topics & activities: view a site (or use photographs) and learn about restoration efforts; discuss how this restoration will create habitat and food for birds.
5. *Bird response to restoration activities* (1 hour)
   a. Pre-test question topics: Discuss the differences (from a birds' point of view) between damaged and undamaged riparian areas; play a foraging or nesting game if there are many kids in the group.
   b. Education topics & activities: Do another bird count or visit the banding station (in an uninjured area); follow up with a discussion of the differences between bird communities in damaged and undamaged riparian areas.

3. Project staff:
Project Coordinator for BEVEP: Kristina Smucker, ASC Program Coordinator
Responsibilities: develop educational materials and coordinate with the Clark Fork Watershed Education Program; hire and train field technicians to operate bird banding stations; supervise bird banding stations and lead birding fieldtrips; prepare a final project report. These activities will require 3.0 months of staffing time at 40 hours/week across the one and a half year project period.

Web Master and Outreach Coordinator for BEVEP: Amy Cilimburg, ASC Assistant Director
Responsibilities: Create a webpage for the Birds' Eye View education program, make educational materials available on the Avian Science Center web site, advertise and assist with bird banding stations and fieldtrips. These activities will require 1.0 month of staffing time at 40 hours/week across the one and a half year project period.

Field technicians:
To be hired. Two technicians will be hired each summer to assist with the operation of bird banding stations and implementation of the Birds' Eye View education program.

4. Contracted services:
Not applicable

5. Permits, regulatory approvals, or property access agreements:
Kristina Smucker holds a federal Master Bander permit (#23206) which is required in order to capture and band songbirds within the United States. Permit applications will also be submitted to Montana FWP and the University of Montana in spring 2006, such that all necessary permits are in hand by June 2006. We do not expect difficulty in obtaining either permit, as their primary functions are to provide information on the locations and kinds of research in progress, rather than to regulate activities.

Permit applications will also be submitted to the National Park Service and Montana FWP to obtain permission to operate bird banding stations at Grant-Kohrs National Park and Beavertail Hill State Park, respectively. We have initiated conversations with Ben Bobowski at Grant-Kohrs NP and Lee Bastian at Montana FWP and both have indicated that public bird banding stations and the Birds' Eye View education program are compatible with their organizations' research and education goals, and we have been encouraged to submit permit applications for this work.

Permission to operate a bird banding station at the Clark Fork Coalition's Dry Cottonwood Ranch has been granted through conversations with Chris Brick and Tracy Stone-Manning and the details of this agreement will be worked out this spring.

6. Long-term effectiveness:
We will ensure that all education materials developed for this program continue to be available beyond the lifetime of the project by (1) making all materials available at the Avian Science Center web site and (2) incorporating them as a lesson plan or unit within the Clark Fork Watershed Education Project's watershed science curriculum guide.

In addition, the Avian Science Center plans to seek funding to continue these bird banding stations for a minimum of five years in order to make the data most valuable for monitoring patterns of adult survival and productivity. Thus, there is potential for these banding stations to remain open to the public in future years and to continue offering the Birds' Eye View education program with minimal financial support.

D. Project Time Schedule

June, 2006:

- Interviews with PIs of two NRDP funded restoration projects and development of materials for pilot Birds' Eye View education program.
- Receipt of all required State and University research permits.

July – August, 2006:

- One banding station will be in operation (once every 10 days).
- Two field trips will occur, giving participants the opportunity to compare bird communities in injured riparian areas to those in relatively uninjured riparian areas.
- Stipends will be available for five Upper Clark Fork River Basin teachers to visit the banding station and participate in the Birds' Eye View program.

December, 2006:

- A progress report describing the Birds' Eye View education program summer activities, including number of participants, age range of participants, and summaries of bird data collected will be delivered to NRDP and will be available at our web site: http://avianscience.dbs.umt.edu/education.htm.
- All Birds' Eye View education materials will be available on our web site for teachers and the general public.

January – May, 2007:

- Interviews with PIs of four additional NRDP funded restoration projects and further development of educational materials.
- Work with Clark Fork Watershed Education Project to integrate the Birds' Eye View education program into the CFWEP watershed science curriculum guide.
- Recruit four Upper Clark Fork River Basin high school students to do a summer internship with the Avian Science Center in which they assist with the operation of bird banding stations and the Birds' Eye View education program.

June – August, 2007:

- Three banding stations will be operated (such that one banding station will be in operation every Tuesday and Saturday).
- Four field trips will occur, giving participants the opportunity to compare bird communities in injured riparian areas to those in relatively uninjured riparian areas.
- Stipends will be available for 10 Upper Clark Fork River Basin teachers to visit the banding station and participate in the Birds' Eye View program.

December, 2007:

- Final report describing all Birds' Eye View education program activities will be delivered to NRDP and will be available at our web site: http://avianscience.dbs.umt.edu/education.htm.
- All Birds' Eye View education materials will be available on our web site for teachers and the general public.

E. Describe Methods and Technical Feasibility of the Proposed Project.

1. Methods used to conduct specific tasks:
The methods used to conduct specific tasks are included in the technical narrative section, above.

2. Project approach to address similar problems:
The Seeley Lake banding station, which has been in operation for the past five summers, provides a good model for developing a hands-on education program that allows the public to learn about birds and their habitats as well as observe and take part in the process of science. This project has been discussed in greater detail in section A-3, above.

3. Certainties and uncertainties associated with any innovative approaches:
Not applicable

4. Uncertainties that require further resolution:

In order for the bird banding data that we propose to collect to be of maximum value to the nationwide program designed to Monitor Avian Productivity and Survival (MAPS), stations should be operated for a minimum of five years. So, while we intend for this program to continue in future years, we currently lack funding to operate stations beyond the two years in this proposal. However, once educational materials are developed, the annual cost of operating bird banding stations and implementing the Birds' Eye View education program would be relatively small (approximately 40 – 50% of the current proposal).

5. Data gaps:
Not applicable

6. Potential complications:
The Avian Science Center is committed to operating one bird banding station in the summer of 2006, regardless of whether this proposal is funded, because in order for the bird banding data that we collect to be useful, we must initiate banding efforts in the first week of June – before the outcome of this grant proposal is known. This effort will be made possible through in-kind support by the Avian Science Center and the use of skilled volunteers and dedicated graduate students at the University of Montana. While a single year of data could serve as a baseline and is useful pilot data for future grant writing efforts, the full value of bird banding data is realized after multiple years of effort (see also discussion of #4, above). Thus initiating this education program in the summer of 2006 represents a risk for the Avian Science Center, but one we believe is worth taking based on our success in using volunteers to operate the Seeley Lake banding station for five years.

F. Monitoring Plan

All bird banding data will be entered into a computer database for inclusion within the nationwide MAPS program. These data will be used to monitor trends in adult survivorship and the production of young at regional scales as well as over time. In addition, recapturing birds banded in previous years provides data to develop tangible educational stories about birds that return each year to the same "home" within the basin, for examples see our web site: http://avianscience.dbs.umt.edu/research_wrenbanding_stories.htm#amro.

The efficacy of the education materials will be evaluated using the subset of 15 teachers that receive stipends to visit banding stations and take part in the Birds' Eye View education program. Before visiting the banding station, teachers will take a pre-test designed to assess their general knowledge of each of the four topics addressed through the Birds' Eye View education program (mining injuries within the UCFRB, response of birds to mining activities, restoration activities, and response of birds to restoration efforts). Teachers will then take a second test after visiting a banding station and participating in the Birds' Eye View program. The post-test will be composed of both pre-test questions and new questions designed to assess the level of detail that teachers retain after participation in the program. We will compile pre- and post-test data and include these results in our final report to allow the Natural Resource Damage program to assess the effectiveness of this education program.

G. Describe Qualifications of the Project Team:

Kristina Smucker holds a M.S. in Wildlife Biology from The University of Montana and has worked for the Avian Science Center for the past two years. Directly relevant to this project, she has over 10 years of experience capturing and banding songbirds, training and supervising technicians, and a strong interest in science education and outreach. She initiated the Seeley Lake Banding station in the summer of 2001 in order to provide a window through which the general public could observe, and even take part in, bird research. Kristina serves as the representative for the Avian Science Center on the technical advisory board for CFWEP and she has been directly involved in two other education projects at the Avian Science Center: 1) the development of a high school science education program, *Students Investigating Burns*, that gets students out into the field to collect data and make comparisons between burned and unburned forests, and 2) teacher training workshops designed to give K-12 teachers the skills and knowledge to use inquiry-based science in their classrooms. Kristina has also been an instructor for Round River Conservation Studies' Ecuador Program, which is a full semester, undergraduate study abroad program focused on ecology and conservation.

Amy Cilimburg received her M.S. in Wildlife Biology from The University of Montana in 2001, studying riparian birds along the Bitterroot River for her thesis work. As the Assistant Director of the Avian Science Center, she coordinates bird monitoring programs, supervises staff, and develops outreach, including the ASC web portal. Amy has worked in science education and avian research for over ten years. Directly relevant to this project, she received a Science Fellowship, partnering with the Montana Natural History Center to develop a public education program to increase understanding of avian ecology and forest fire; specifically she educated public teachers and local citizens through workshops and field trips and developed a web site relevant to the Northern Rockies. She has also been directly involved in our *Students Investigating Burns* Program and other teacher training workshops (see our web site http://avianscience.dbs.umt.edu/education_k12.htm). Finally, Amy also has extensive experience banding songbirds and training field crews.

H. Supporting Technical Documentation

1 and 2. Literature Cited

Beyer, W., J. Dalgarn, S. Dudding, J. French, R. Mateo, J. Miesner, L. Sileo, J. Spann. 2005. Zinc and Lead Poisoning in Wild Birds in the Tri-State Mining District (Oklahoma, Kansas, and Missouri). Archives of Environmental Contamination and Toxicology 48 (1): 108-117.

Cordell, H. K., C.J. Betz, and G.T. Green. 2002. Recreation and the environment as cultural dimensions in contemporary American society. Leisure Sciences 24:13-41.

Mosconi, S. L., and R. L. Hutto. 1982. The effect of grazing on the land birds of a western Montana riparian habitat, p. 221-233. In L. Nelson, and J. M. Peek [eds.], Proceedings of the wildlife-livestock relationships symposium. Forest, Wildlife and Range Experiment Station, Univ. Idaho, Moscow, ID.

Pastor, N., R. Baos, M. López-Lázaro; R. Jovani; J.L. Tella; N. Hajji; F. Hiraldo; F. Cortés., A 4 year follow-up analysis of genotoxic damage in birds of the Doñana area (south west Spain) in the wake of the 1998 mining waste spill. 2004. Mutagenesis 19(1): pp. 61-65.

Prodgers, R. 2006. Revegetation and bird monitoring- Subarea 1 2005 report. 16 pp + appendices.

3. Project map.

Maps of the proposed project areas are in Appendix I, pages i through iv. The project area map shows the locations of the proposed banding stations and birding fieldtrip sites in proximity to population centers within the Upper Clark Fork River Basin. Maps of the three proposed bird banding site locations are also included.

4. Easements, right-of-way or other access agreements.

No easements or right-of-way documents are required to complete the project. Conversations have been initiated to obtain access for banding stations at specific sites, and this is discussed in section C-4, above.

Step 4. CRITERIA STATEMENTS

1. Relationship of Expected Costs to Expected Benefits:

The total direct cost requested from NRDP for this one and a half year grant proposal, which consists of a pilot year and an additional one year, is $20,829 and indirect costs are $4,166. If we are able to meet our relatively conservative goal of 15 visitors per day on each banding occasion or birding fieldtrip, this program will reach over 550 individuals. Thus the cost per participant to NRDP is approximately $45.45.

While the direct benefits of educational programs are difficult to quantify, the Birds' Eye View program can be expected to benefit residents within the Upper Clark Fork River Basin by yielding:

1. Increased understanding of how riparian areas were damaged by mining, how they are being restored, and how birds can be used to measure the health of riparian areas.
2. Increased visitation by families to natural areas within the basin to observe and learn about birds that live in their "backyards".
3. Increased understanding of how biologists study birds, direct access to and interactions with biologists, and a sense of ownership of the scientific data collected at bird banding stations.
4. Four UCFRB high school students will gain Avian Science Center mentors via our internship program.
5. Education materials that provide a bird's-eye perspective on past mining activities and current restoration projects. These materials will be available on our web site and incorporated into CFWEP's watershed science curriculum guide.
6. Baseline data on bird communities, annual adult survival, and production of young.

In addition to these expected benefits to the target audience during the summer months, the stipends provided to 15 UCFRB teachers will serve as a conduit to reach an even larger number of students within the basin when teachers take the Birds' Eye View education program back to their classrooms.

2. Cost Effectiveness:
There are currently several other education programs (e.g. CFWEP and Ramsay School Watershed and Ecosystems) in progress within the Upper Clark Fork River Basin that rely on scientists to volunteer their time, knowledge, and expertise in order to provide science content for the programs. While this approach may be cost effective for the educational program, the real costs are simply transferred to the scientific community, and thus the approach is most likely not sustainable in the long-term.

This proposal would provide the financial support for biologists to do bird research, involve the public in this effort, share research results, and interpret these findings to provide a bird's perspective on the health of riparian areas along the Clark Fork River. Thus biologists are directly responsible for, but are also directly supported by, designing an education program that provides a bird's perspective on watershed science. This program will complement existing educational programs within the basin and increase their potential for success by providing high quality bird education materials and access to biologists. We believe this will improve the overall cost effectiveness of NRDP funded education programs across time and throughout the basin.

3. Impacts to the Environment and Human Health and Safety:
This project has little potential for negative environmental impacts, but efforts will be made to site banding stations in areas where the vegetation can withstand trampling from human visitors. Mist nets used to capture birds will be placed in natural openings that require minimal pruning of vegetation. Banding stations will also be selected to maximize ease and safety of public access (i.e. all sites will have safe parking areas and will be accessible by roads and/or trails to accommodate visitors with limited mobility).

4. Public Support:
This proposal has the strong support of the basin-wide Clark Fork Watershed Education Program, please see attached letter of support in Appendix II. In conversations initiated with personnel at the three sites for proposed banding stations we have received verbal support and enthusiasm for this kind of education program. The Clark Fork Coalition will send a letter of support directly to NRDP, and we can solicit letters of support from personnel at MT Fish Wildlife and Parks and Grant-Kohrs National Park if needed.

In addition, bird watching is the fastest growing form of outdoor recreation in the United States, with an estimated 71.2 million participants nationwide in 2001 (Cordell et al. 2002). Public enthusiasm for learning about birds has been evident at our Seeley Lake bird banding station, and we have experienced tremendous public interest in this program. The opportunity for the general public to view wild songbirds "in-the-hand" is simply captivating, and the chance to interact directly with birds and biologists is an experience that is not readily forgotten.

5. Public Access:
All sites for banding stations and birding fieldtrips have adequate public access, and there will not be any changes or limitations to public access as a result of this project.

Budget, p. 1 of 5

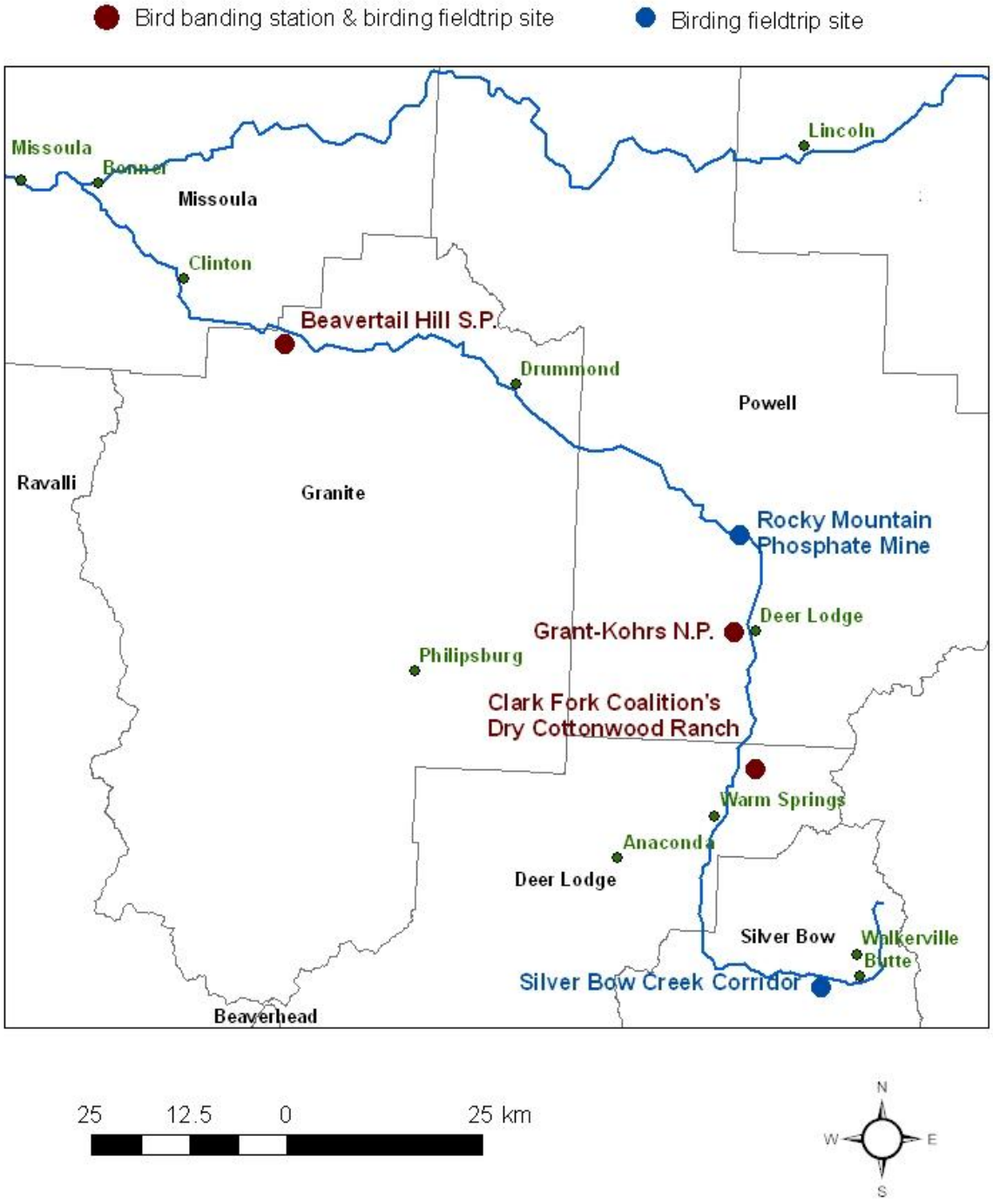
Budget, p. 2 of 5

Budget, p. 3 of 5

Budget, p. 4 of 5

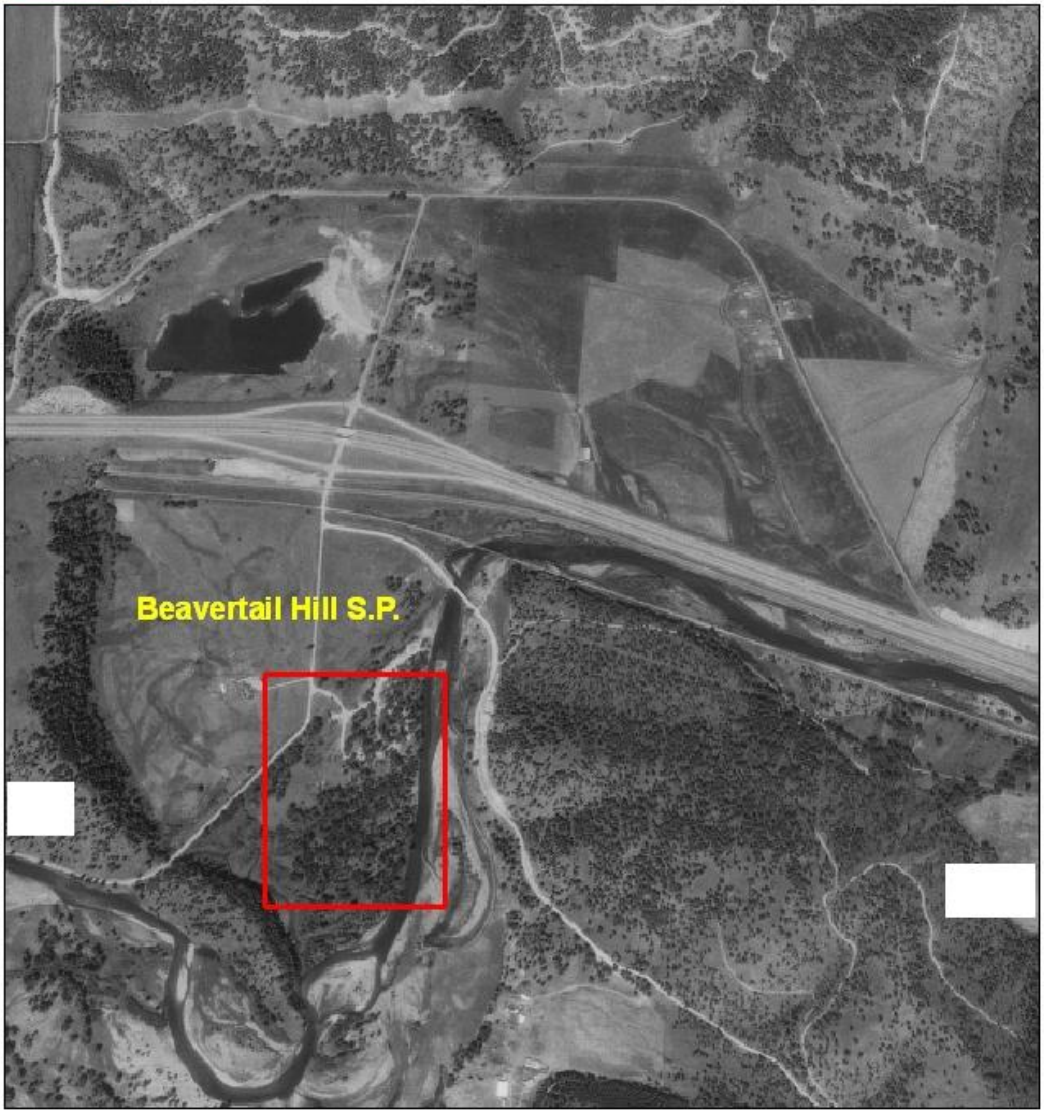
Budget, p. 5 of 5

Map of the Birds' Eye View project area showing the distribution of banding stations and birding field trip sites in relation to populations centers



Banding Station site at Beavertail Hill State Park
25 mi east of Missoula, MT

Mist-nets will be deployed within this 400 x 500 m area to capture songbirds

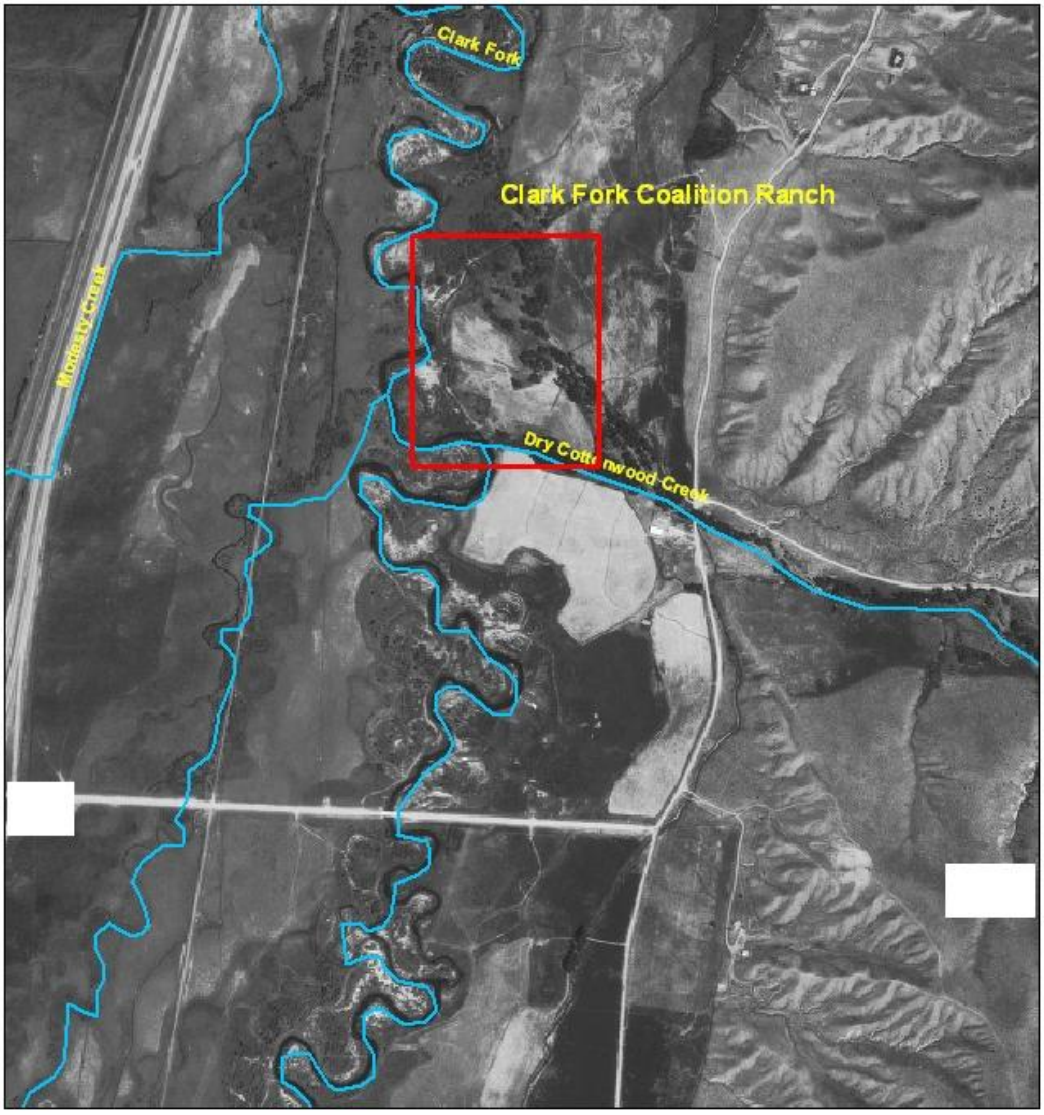


Banding station site at Grant-Kohrs National Park
on the north side of Deer Lodge, MT

Mist-nets will be deployed within this 400 x 500 m area to capture songbirds

Banding station site at the Clark Fork Coalition's Dry Cottonwood Ranch near Galen, MT

Mist-nets will be deployed within this 400 x 500 m area to capture songbirds



1,000 500 0 m

N W E S